Product Brochure

Anritsu

MG3700A

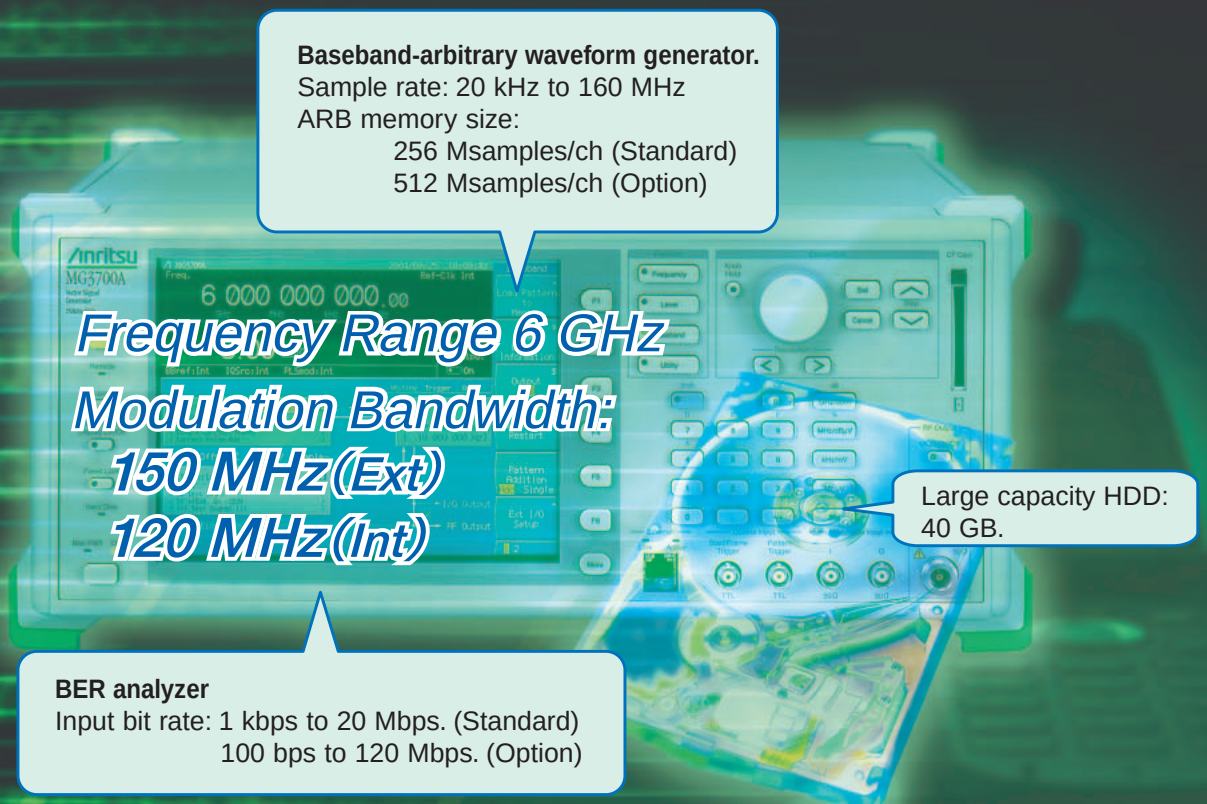
Vector Signal Generator

250 kHz to 3 GHz, 250 kHz to 6 GHz (Option)

For measurement of wireless communications evolving into “high speed, large capacity, and wide band”.

Wireless communications, which are now evolving rapidly, are moving into high speed, large capacity, and wide band.
And next-generation wireless communications are addressing a new communication format that combines cellular phones with the access of wireless LANs.
MG3700A is a vector signal generator based on a 160 MHz arbitrary waveform generator that includes the features of “Wide vector modulation bandwidth” and a “Large capacity baseband memory.”
Furthermore, MG3700A supports digital modulation of signals for various wireless communication systems, enabling you to evaluate general mobile communications, such as cellular phones and wireless LANs.
Anritsu’s waveform generation software IQproducer™ can create waveform patterns and transmit them to MG3700A via 100BASE-TX Ethernet. Furthermore, IQ sample data files (in ASCII format) programmed by using general EDA (Electronic Design Automation) tools such as MATLAB® can also be converted to waveform patterns for MG3700A.
And a custom-made waveform pattern file can be generated arbitrarily.

*MATLAB is a registered trademark of The Math works, Inc.



■Performance and functions

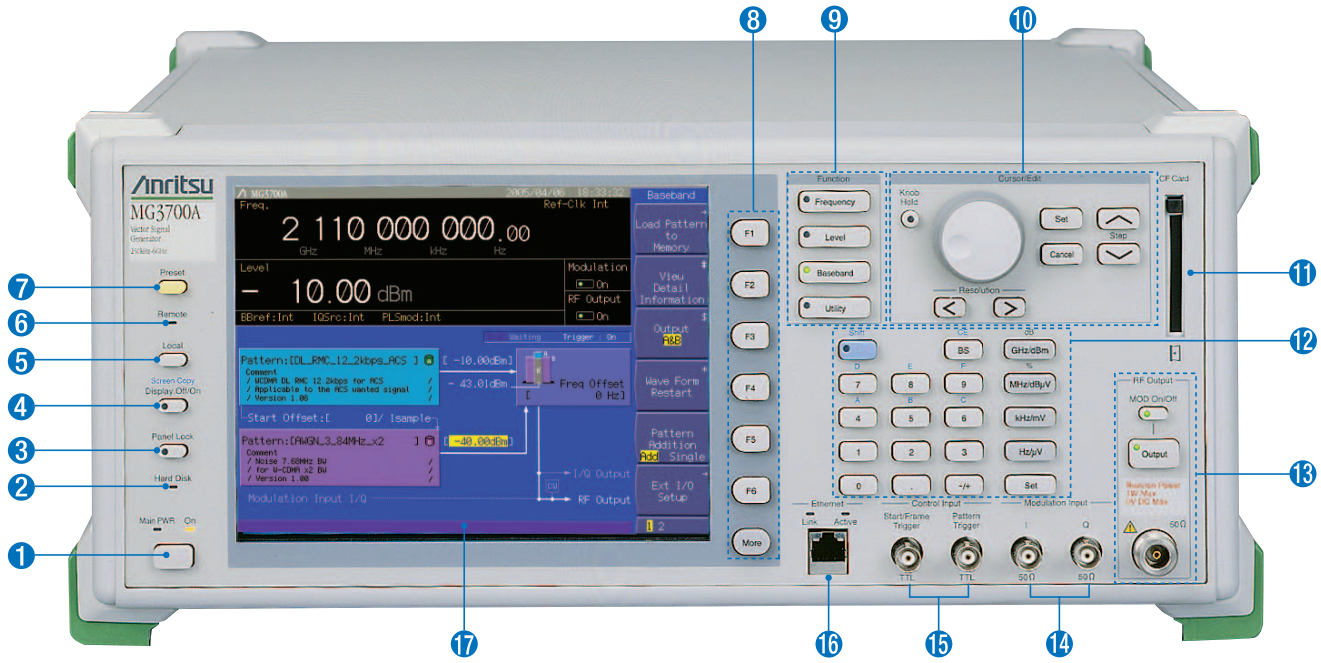
- Frequency Range 250 kHz to 6 GHz
  - 250 kHz to 3 GHz (Standard)
  - 250 kHz to 6 GHz (Option)
- Wide vector modulation bandwidth
  - 120 MHz (Internal base band generator)
  - 150 MHz (External IQ input)
- High level accuracy
  - ±0.5 dB (Absolute level accuracy)
  - ±0.2 dB typical (Linearity)
- High speed waveform transmission by 100BASE-TX Ethernet.
- 40 GByte hard disk is built in.
- Large capacity baseband memory.
  - 1 GBytes = 256 Msamples/channel (Standard)
  - 2 GBytes = 512 Msamples/channel (Option)
- Waveform addition function
  - Two signals, such as wanted signal + interfering signal or wanted signal + AWGN, can be added and outputted.
- Standard 20 Mbps BERT analyzer is built in.
  - 1 kbps to 20 Mbps (Standard)
  - 100 bps to 120 Mbps (Option)

■Support for various communication systems Standard *1

- Waveform Patterns:
  Arbitrary waveform patterns corresponding to the following communication systems are included as standard.
  Features:
  W-CDMA/HSDPA, GSM/EDGE, CDMA2000® 1X/1xEV-DO Wireless LAN (IEEE802.11a/b/g), PDC, PHS, AWGN, *Bluetooth*®*2, GPS, Digital Broadcast (ISDB-T1 segment, BS, CS, CATV)
- Optional Waveform Patterns:
  Arbitrary waveform patterns corresponding to the following communication systems are provided as options:
  TD-SCDMA
  Public Radio System (RCR STD-39, ARIB STD-T61/T79/T86)
- Waveform generation software: IQproducer™
  (Software license is optional)
  IQproducer™ is PC application software with a graphical user interface for changing parameters and generating waveform patterns that comply with various communication systems:
  W-CDMA, AWGN
  HSDPA/HSUPA*3, TDMA*3, CDMA2000 1xEV-DO*3, Multi-carrier*3, Mobile WiMAX*3, DVB-T/H*3

*1 Please refer to the catalog “MX370x series software” for details.
*2 The *Bluetooth* word mark and logos are owned by the Bluetooth SIG, Inc. and any use of such marks by Anritsu is under license. Other trademarks and trade names are those of their respective owners.
*3 The license installed in mainframe is necessary.
*CDMA2000® is a registered trademark of the Telecommunications Industry Association (TIA-USA).

Easy-to-use panel design



❶ Main PWR (Power supply switch)
Switches power On/Off. When power is supplied, the left lamp (Main PWR) turns green. Furthermore, the right lamp (On) turns orange at the time of Power On.

❷ Hard Disk (Hard disk lamp)
The light turns on when the mainframe built-in HDD is being accessed.

❸ Panel Lock (Panel lock key)
All key operations except the power supply switch and Local are disabled. A lamp (red) lights in panel lock state.

❹ Display Off/On (Display Off/On key)
Switches the display On/Off. A lamp (red) lights up when the display is off.

❺ Local (Local key)
Disables remote control by GPIB and Ethernet and allows local control only.

❻ Remote (Remote lamp)
Turns on in when remote control is Being carried out by GPIB and Ethernet.

❼ Preset (Preset key)
Setup a parameter to its initial state.

❽ Function Keys (Soft function keys)
Chooses and executes the menu displayed on the extreme right of the display. When there are two or more menu screens, additional menu pages are viewed via the “More” key.

❾ Function (Main function key)
Changes modes for setting up the main functions of this equipment:
Frequency: Frequency setting mode
Level: Output level setting mode
Baseband: Baseband setting mode
Utility: Utility setting mode

❿ Cursor/Edit (Cursor/Editing key)
Used for item selection or entering a numerical setting. “Set” finalizes the selection and “Cancel” cancels it. The rotary knob is disabled when “Knob Hold” is pressed and its lamp is on.

⓫ CF Card (Compact Flash card slot)
A slot for the memory card used for installing waveform patterns or software, and for saving screen displays.

⓬ Numeric Keypad
Shift: Press this key first (its lamp lights) to enable the blue-letter functions on the panel above the keys.
Numeric keys: It is used in the case of a numerical setting.
Unit keys: Indicates the unit after a numerical input.

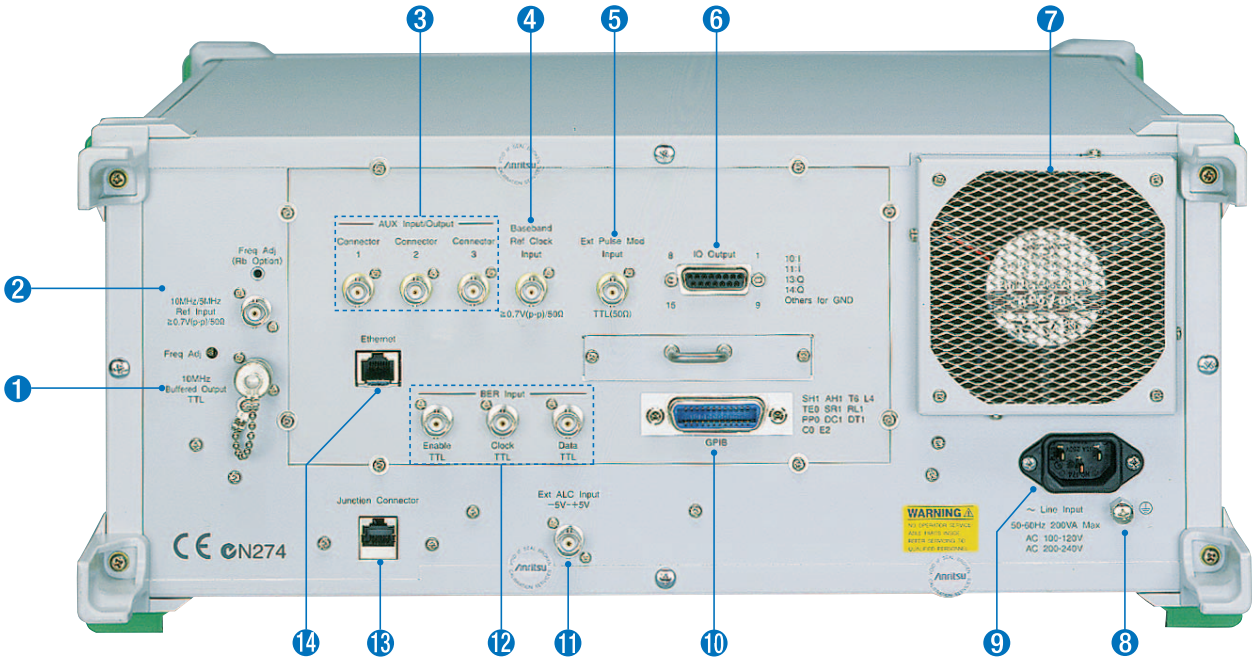
⓭ RF Output (RF Signal Output)
Output: Changes the RF signal output on/off state. Its lamp lights when the RF signal output is enabled.
MOD On/Off: Turns modulation on/off when RF signal output is enabled. Its lamp lights when the RF signal is being modulated.
RF Output: The connector for RF signal output. (N-J, 50 Ω)

⓮ Modulation Input (External IQ modulation input connector)
I/Q input signal when an external baseband signal performs vector modulation.
(BNC-J, 50 Ω, Input voltage range ±5 Vpeak)

⓯ Control Input (Control input connector)
Start trigger, frame trigger and pattern trigger input signal.
(BNC-J, TTL, Polarity reversal of rising/falling edges is possible.)

⓰ Ethernet (100BASE-TX LAN connector)
A connector for linking to a PC when performing remote control or transmitting a waveform pattern. When using this connector, the two Ethernet connectors on the back panel are short-circuited by the attached LAN straight cable.
(8-pin Cat-5 modular jack)

⓱ Display (Display)
8.4 inch, 640 x 480 dots, Color TFT LCD.
The screen display can be saved on the HDD or CF card as a picture file in color or gray scale.



❶ Buffered Output (Reference frequency signal output connector)
Output for this equipment's 10 MHz reference frequency signal. This signal is for synchronizing with other equipment. This signal is outputted whenever the mainframe power is on. (BNC-J, TTL, DC coupling)

❷ Ref Input (Reference frequency signal input connector)
External reference frequency signal (10 MHz or 5 MHz) input. It is for signals with higher accuracy than the reference frequency inside this equipment, or when synchronizing with the reference signal of other equipment. (BNC-J, ≥0.7 Vp-p/50 Ω AC coupling)

❸ AUX Input/Output (AUX I/O connector)
Marker signal output. (BNC-J 3 port, TTL)

❹ Baseband Ref Clock Input
(Baseband reference clock input connector)
Input for the clock signal that becomes the reference for the D/A sampling clock. (BNC-J, ≥0.7 Vp-p/50 Ω AC coupling, Input frequency range 20 kHz to 160 MHz)

❺ Ext Pulse Mod Input (External Pulse Mod signal input connector)
External input signal for controlling the signal output on/off in a pulse modulation function. (BNC-J, 50 Ω, Input voltage range 0 to 5 V, Threshold= about 1 V)

❻ IQ Output (IQ output connector)
Differential output of the baseband signal (I/Q) generated in the arbitrary waveform generation function (D-Sub 15-J, 50 Ω). If the optional accessory "IQ output conversion adapter (option)" is used, it is convertible to BNC.

❼ Fan (Fan for air cooling)
An air cooling fan for suppressing the internal temperature rise of this equipment.

❽ Protective earth terminal
This terminal should be grounded when a grounded power cord cannot be used.

❾ Line Input (AC power input)
AC input for the power supply.

❿ GPIB (GPIB connector)
Used when performing remote control by GPIB.

⓫ Ext. ALC Input (External ALC connector)
External DC voltage input for controlling the output level. (+3 to –8 dB)
(BNC-J, 600 Ω, Input voltage range ±5 V)

⓬ BER Input (BER input connector)
Used for BER measurements:
Enable: BER measurement gate signal input.
Clock: Input for clock signal synchronized with the data.
Data: Data input. (BNC-J, TTL)

⓭ Junction Connector
When using the Ethernet connector on the front panel, this Junction connector and the Ethernet connector above must be short-circuited by the attached LAN straight cable. (8-pin Cat-5 modular jack)

⓮ Ethernet
Ethernet connector for linking to a PC when performing remote control or transmitting a waveform pattern.
This connector can be used instead of the Ethernet connector on the front panel.
(8-pin Cat-5 modular jack)

Basic performance

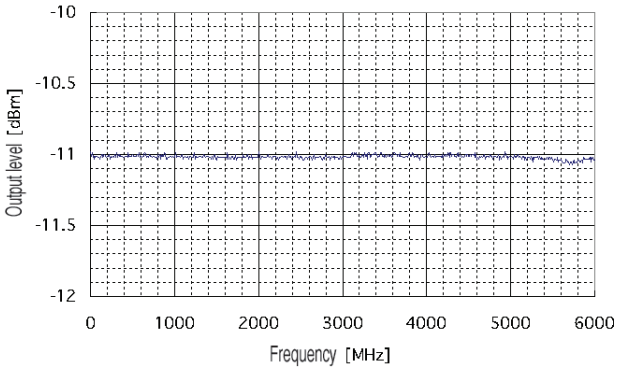
■Covers frequency range 250 kHz to 6 GHz.

Choose either 250 kHz to 3 GHz (standard) or 250 kHz to 6 GHz (option) for the frequency range. A 6 GHz upper frequency is required for the WLAN 5 GHz band frequency and next-generation communication system support.

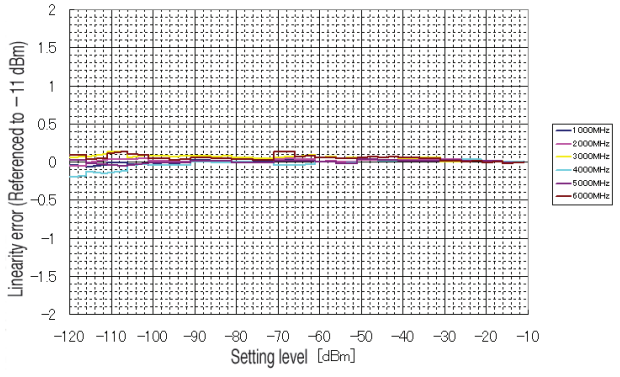
■High level accuracy:

Excellent level accuracy assures a high level of overall measurement accuracy.

•Absolute level accuracy:
±0.5 dB typ (≥–120 dBm 25 MHz≤ fc ≤3 GHz, E-ATT*)
±0.8 dB typ (≥–120 dBm 3 GHz< fc ≤6 GHz, E-ATT*)
±0.5 dB typ (≥–120 dBm 25 MHz≤ fc ≤3 GHz, M-ATT*)
±0.8 dB typ (≥–100 dBm 3 GHz< fc ≤6 GHz, M-ATT*)
＊E-ATT: Electronic attenuator, M-ATT: Mechanical attenuator



Frequency characteristic

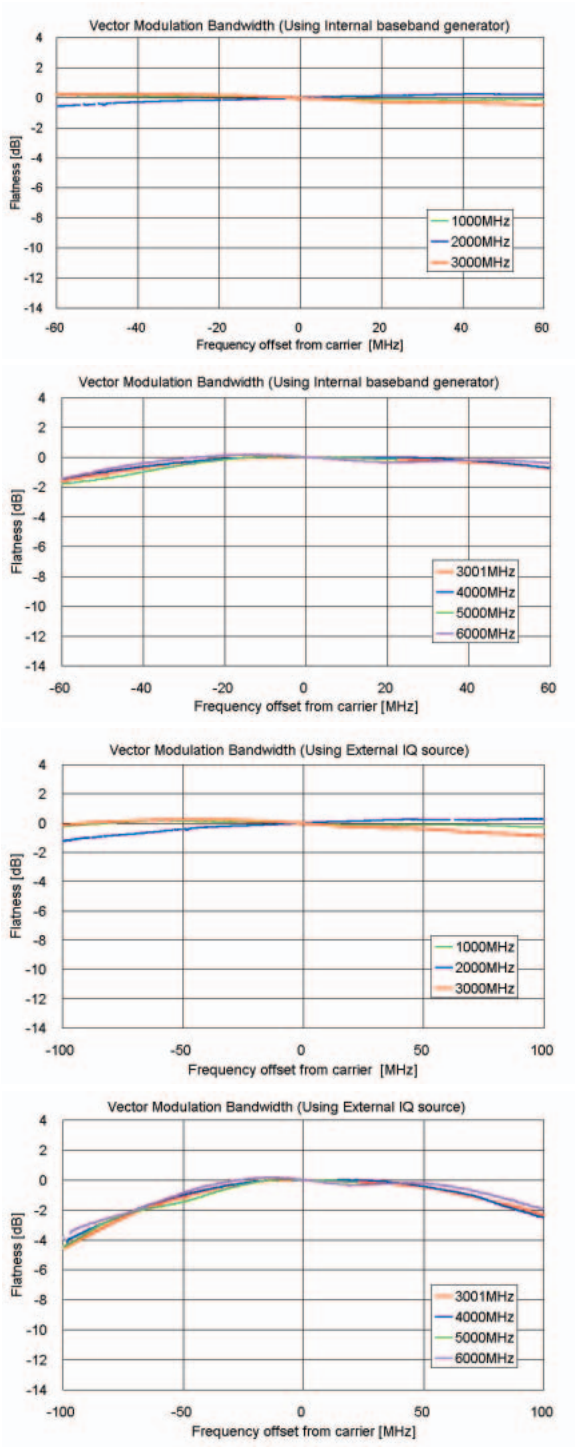


Linearity

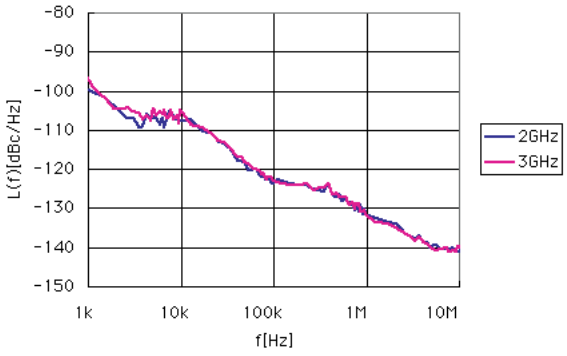
■Wide vector modulation bandwidth.

120 MHz (Using internal baseband signal generator)
150 MHz (Using External IQ input)

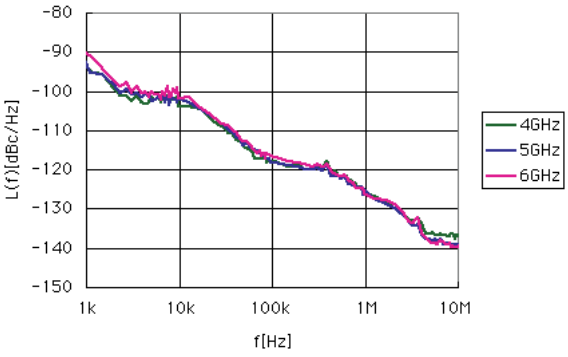
A wider “RF modulation bandwidth” of 120 MHz is achieved when internal baseband signal generation is used. Furthermore, 150 MHz vector modulation bandwidth is supported for up to 6 GHz frequency when the External IQ input is used.



Vector Modulation Bandwidth (Using external IQ input)



SSB phase noise (25 MHz≤f≤3 GHz)
(CW, Continuous mode: OFF, Frequency changing speed: Normal)



SSB phase noise (3 GHz<f≤6 GHz)
(CW, Continuous mode: OFF, Frequency changing speed: Normal)

Supports large capacity waveform patterns.

■High-speed waveform transmission by 100BASE-TX Ethernet.

As communication systems evolve into wide-band and high speed transmission, long waveform patterns must be transmitted. To accommodate such long patterns at high speed, the MG3700A supports 100BASE-TX LAN connections.
When the waveform patterns of two or more MG3700A systems need to be updated, waveform data can be simultaneously transmitted to all MG3700A via LAN, so update time can be shortened.

- High-speed transmission of waveform patterns: 2 Mbytes/s is possible.
- Waveform patterns transmitted to MG3700A from an external PC are saved to the built-in 40 Gbyte hard disk.
- LAN connectors are available on both the front and back panels. Either can be chosen depending on the usage environment.

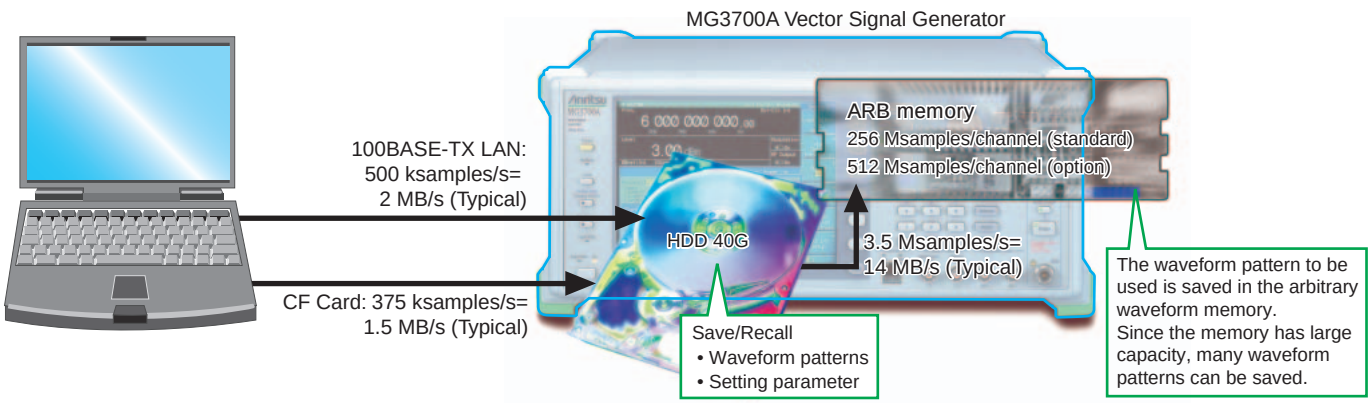
■40 Gbyte hard disk is built in.

Various large-capacity waveform patterns and MG3700A parameters can be saved to the 40 Gbyte hard disk.
The transmission speed between the hard disk and the waveform memory is very high (14 Mbyte/s typical).
If a hard disk breaks down, you can exchange it using the “HDD ASSY (option)” optional accessory.

■Arbitrary waveform memory supports up to 2 GBytes.

1 GBytes = 256 Msamples/channel (standard)
2 GBytes = 512 Msamples/channel (option)

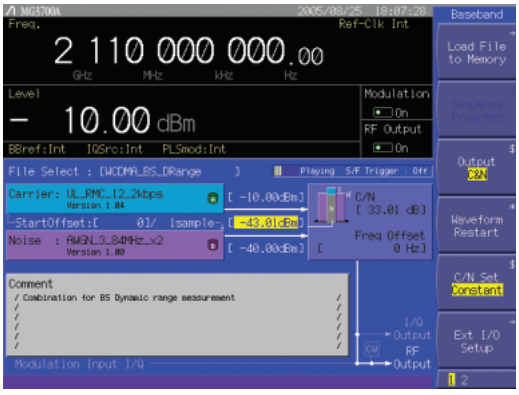
Since the arbitrary waveform memory has a large capacity, many waveform patterns can be saved simultaneously.
Waveform patterns are read from the hard disk and saved in memory, to be outputted instantly without accessing the hard disk again.
Although the standard MG3700A arbitrary waveform memory can save 256 Msamples/channel (128 Msamples/channel x 2) it is further extensible to 512 Msamples/channel (256 Msamples/channel x 2) as an option.



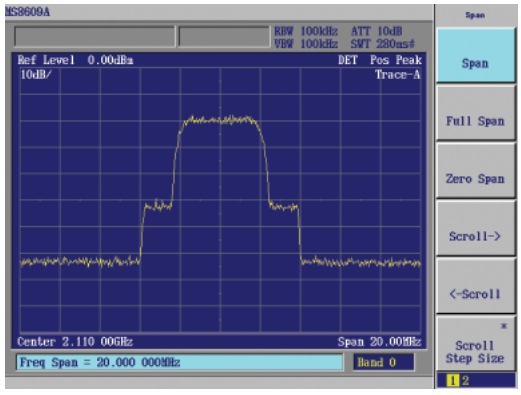
Useful standard functions

■Waveform combining function

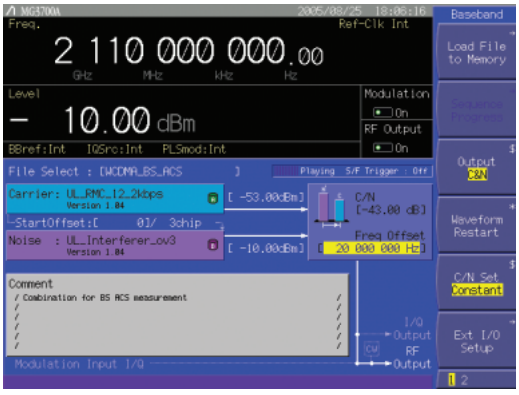
MG3700A contains two built-in arbitrary waveform memories, and these two memories can each choose one waveform pattern, respectively. MG3700A can output the signal of either one of the memories, and can also combine and output both signals simultaneously. When measuring receiver characteristics, such as “ACS: Adjacent Channel Selectivity” or “Blocking characteristics”, the “Wanted Signal+Interfere Signal” and “Wanted Signal+AWGN” can be outputted by one MG3700A. Since digital processing is used for adjustment and S/N, the level ratio accuracy is excellent.



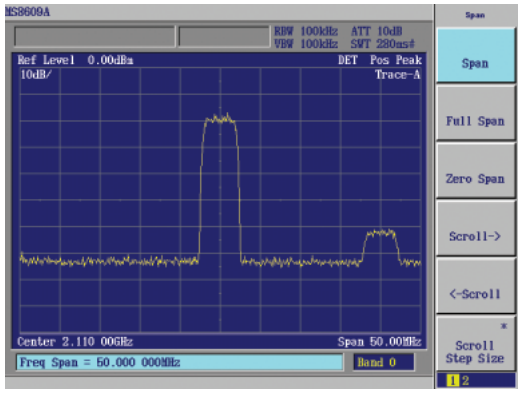
Wanted Signal + AWGN screen



Output waveform screen



Wanted Signal + Interfering Signal screen



Output waveform screen

[Combination file]

The Combination function makes the work of waveform addition even easier. The Combination function uses a file with various parameters such as the pattern selection for the two output waveforms, the output level ratio, and the offset frequency. Simply selecting this file performs these settings automatically.

Steps required without combination function

- Processing required waveform + interference waveform
  - Set required waveform in memory A.
  - Set interference waveform in memory B.
  - Set level of required waveform.
  - Set level of interference waveform.
  - Set offset frequency of required and interference waveforms.
- Processing W-CDMA control CH + Data CH
  - Set Control CH in memory A
  - Set Data CH in memory B.
  - Set level of Control CH.
  - Set level of Data CH.

Effect of combination function

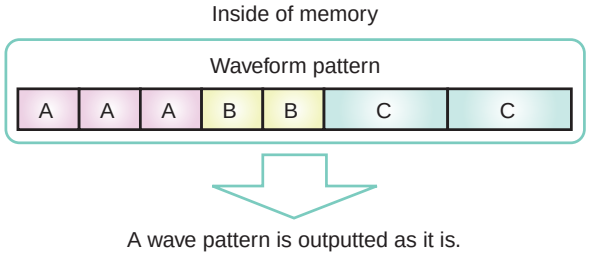
Auto-setting by just selecting the combination file.
The combinations file is generated with IQproducer.
(Please use the appended file the combinations file of “Control CH + data” of W-CDMA.)

Sequence Mode

Sequence Mode is a Combination function application that saves operating parameters, such as the waveform pattern repetition times, waveform pattern switching, and output level settings, to a file. Simply selecting this file performs these operations automatically. This is very convenient when investigating state transitions in response to received signals, such as during connection procedures.

Steps required without sequence mode

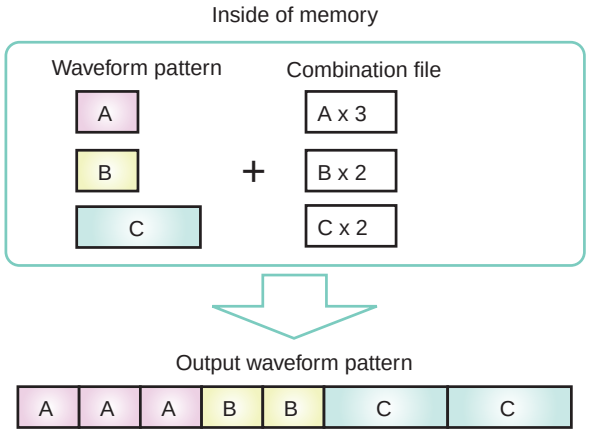
- Create a single waveform pattern combining the required waveform pattern type and times, and save it in memory.
- Create a new waveform pattern whenever the repetition time changes.



Effect of sequence mode

The required waveform pattern and combination file are saved in memory. Moreover, an external trigger can be used to repeat each waveform pattern any number of times.

⇒ Makes efficient use of memory
⇒ Permits investigation of response status transitions
⇒ Enables manual sequence control

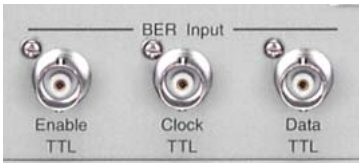


Standard 20 Mbps BER is built in.

A BER analyzer is a standard feature, allowing BER measurement of the receiving characteristic to be performed easily. Input bit rate: 1 kbps to 20 Mbps
Measurable BER: 0 to 1%
There is also a BER option for measurement from 100 bps to 120 Mbps (see the next page).

BER measurement screen

This can be used by connecting the signal demodulated by the DUT to the Enable/Clock/Data BNC connectors on the back panel of the equipment.
In addition, a log of up to 100 BER measurement results can be saved. The log file contains test information including measurement time and date, error rate, bit count, termination cause, and measurement mode.



Connector of the rear panel

Please note “Time” setting is in the count mode of the general built-in BER measurement equipment, but it is not in the high-speed BER measurement function of MG3700A-031/131.

Count mode	Standard BER measurement function	MG3700A-031/131 High speed BER test function
Time	✓	
DataBit/Data	✓	✓
Error		✓

Options

Hardware options:

Model: MG3700A-001
Name: Rubidium Reference Oscillator
This provides a 10 MHz reference signal VCO. Frequency stability is improved compared to the standard VCO.
Frequency: 10 MHz
Aging rate: ±1 x 10^{-10}/Month
Temperature stability: ±1 x 10^{-9} (0 to +50˚C)

Model: MG3700A-002
Name: Mechanical Attenuator
The standard electronic attenuator is changed to a mechanical attenuator. This improves the maximum permissible output level and the distortion characteristic.
Settable range: –140 to +19 dBm
Accuracy range (CW): –140 to +10 dBm

Model: MG3700A-011
Name: Upper Frequency 6 GHz
The upper frequency range is extended to 6 GHz from 3 GHz. Frequency range after extension: 250 kHz to 6 GHz

Model: MG3700A-021
Name: ARB Memory Upgrade 512Msample
The memory capacity of the ARB unit for arbitrary waveform generation is extended to “256 Msample/channel x 2” from “128 Msample/channel x 2.”

Model: MG3700A-031
Name: High speed BER Test function
This option upgrades the standard built-in BER measurement functions as follows:
- Enhancing of measurement data rate: 100 bps to 120 Mbps
- Addition of SyncLoss count function
- Addition of discontinuous PN data measurement function
- Addition of user pattern measurement function

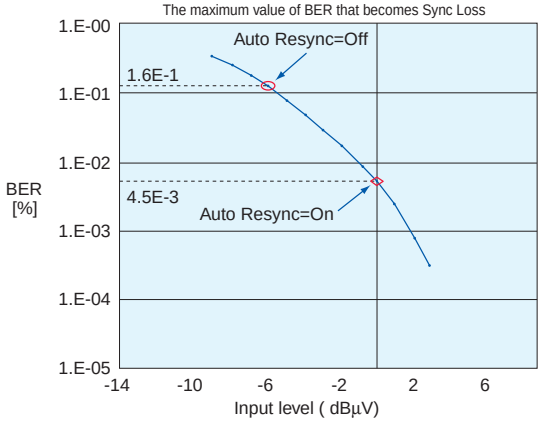
Comparison between standard BER measurement function and option BER measurement function

		Standard BER measurement function (ver2.02 or later)	MG3700A-031/131 High speed BER Test function	Case used
On/Off function of Auto Resync		✓	✓ + Threshold adjustment	It is possible to perform continuous measurement of even high error rates by changing the measurement conditions to match the error rates. "Auto Resync=OFF" is required for manufacturing inspection of some communications systems requiring reception sensitivity with BER=1%, and for R&D applications that evaluate reception sensitivity limits.
Count Mode*1	Time	✓		Measurement range can be set.
	DataBit/Data	✓	✓	
	Error		✓	
Measurement data rate upper limit		20 Mbps	120 Mbps	This can be used for WLAN and next-generation high-speed communications systems.
SyncLoss count function		–	✓	This can be used for continuous measurement even when synchronization loss occurs.
Measurement of discontinuous PN data		–	✓	When the size of continuous data such ISDB-T PN23 exceeds the MG3700A memory capacity, measurement can be performed by reducing the memory requirements using discontinuous PN data.
User pattern measurement		–	✓	This can be used for measuring fixed patterns such as those specified by WiMAX.

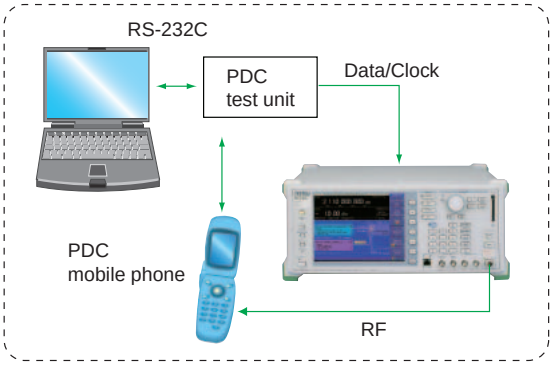
*1: The measurement count of standard BER measurement function (ver2.02 former) was able to be set by "Time" and "Number of bits". The High-speed BER Test function option is lost of the setting of "Time", and can set "Number of bits" and "Number of error bits".

BER Measurement Variation Caused by Auto Resync On/Off

The figure below shows one example of a BER measurement that indicates SyncLoss. Actual results depend on the specific communication system and data rate, and will not necessarily match the measurement values below.



Example of measurement system



■ Software options: Waveform pattern*:

Waveform pattern options provide waveform data that meet the requirements of various communication systems and can be used by the MG3700A built-in arbitrary waveform generator. Waveform patterns are downloaded to the MG3700A for use.

Model: MX370001A
Name: TD-SCDMA Waveform Pattern
Waveform patterns for transmission/reception test of the 3GPP 1.28 Mcps TDD Option (TD-SCDMA) are provided.

Model: MX370002A
Name: Public Radio System Waveform Pattern
Waveform patterns that comply with RCR STD-39 and ARIB STD-T61/T79/T86*.
Waveform patterns, such as Uplink/Downlink and the continuation waves PN9/PN15, are provided.
RCR STD-39: narrow band digital-communications system
ARIB STD-T61: narrow band digital-communications system
ARIB STD-T79: Public digital-communications system
ARIB STD-T86: Public digital-communications system

■ Software options: IQproducer™ License*:

IQproducer can be installed in a PC to evaluate its operation before purchase. In order to download generated waveform patterns to the MG3700A and to output signals, the following IQproducer license options are required:

Model: MX370101A
Name: HSDPA/HSUPA IQproducer
Parameters can be changed and the desired waveform patterns can be generated for HSDPA Uplink/Downlink and HSUPA E-DPDCH/EDPCCH.

Model: MX370102A
Name: TDMA IQproducer
Parameters can be changed and the desired waveform patterns can be generated for TDMA system signals. The parameters that can be set include Modulation, Frame, Slot, Data, and Filter.

Model: MX370103A
Name: CDMA2000 1xEV-DO IQproducer
Parameters can be changed and the desired waveform patterns can be generated for CDMA2000 1xEV-DO Forward/Reverse signals.

Model: MX370104A
Name: Multi-carrier IQproducer
The MX370104A Multi-carrier IQproducer™ is GUI-driven PC application software for creating multi-carrier waveform patterns corresponding to the modulation and tone signals of various communication systems.
There is also a function for converting two waveform patterns with different sampling rates to a waveform pattern with one sampling rate, as well as a function for creating a waveform pattern with W-CDMA Downlink multi-carrier and clipping.

Model: MX370105A
Name: Mobile WiMAX IQproducer
A part of the parameter of MAC management messages of DL/UL-MAP and DCD/UCD, etc. can be set.
The generated waveform pattern can be used for a part* of 8.4.13 Receiver Requirement of IEEE802.16e.
[*: Function test (HO etc.) that cannot be done only by the signal generator is excluded.]

Model: MX370106A
Name: DVB-T/H IQproducer
The parameters for the ETSI EN 300 744 V1.5.1 (2004-11) Physical Layer specification are set and a waveform pattern is generated. A video file waveform pattern is generated by reading the user's MPEG-2 TS file. The generated waveform pattern can be used for the receiver sensitivity test using BER measurement and for the final operation check using the video.

*: Please refer to the catalog “MX370x series software” for details.

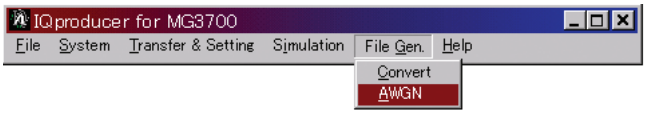
Useful functions of the waveform generation software IQproducer™

■ Functions of IQproducer™:

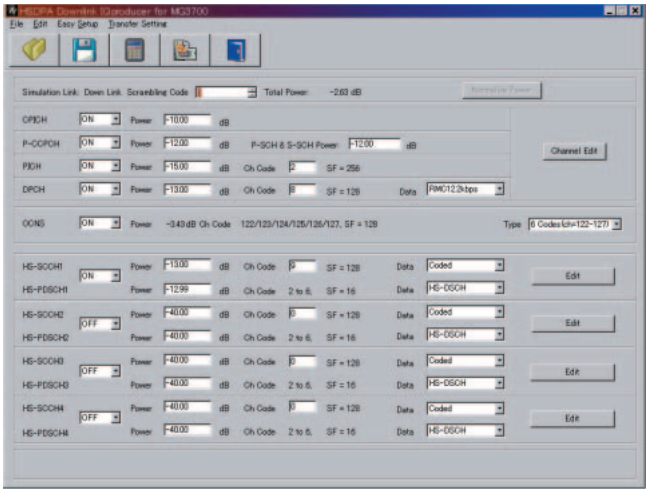
IQproducer™ is PC application software, that can generate waveform patterns and transmit them to MG3700A.
IQproducer™ is provided with MG3700A as a standard feature, and has the following four functions.

- Parameter setting function
- Simulation function
- File generation function
- Data transfer function

• Parameter setting function: System



The IQproducer™ System function has a graphical user interface corresponding to each communication system so you can set up parameters easily. A file with the resulting parameter settings can also be saved and recalled.



HSDPA IQproducer™ setting screen sample

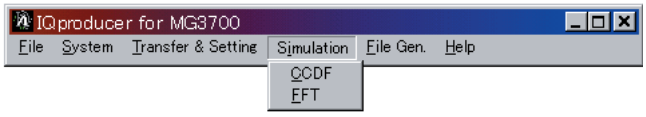
• IQproducer™ Operating Environment

CPU	Pentium® Ⅲ, 1 GHz or more
Memory	≥512 Mbytes
HDD	≥10 GBytes
Display	1024 x 768 pixels or greater
OS	Windows® 2000 Professional, Windows® XP

Pentium® is a registered trademark of Intel Corporation in the United States and other countries.
Windows/Windows2000/WindowsXP is a registered trademark of Microsoft Corporation in the United States and other countries.

After trying the waveform pattern generation function with the IQproducer™ System function, in order to actually use a waveform pattern in MG3700A the license (option) corresponding to each system is required.

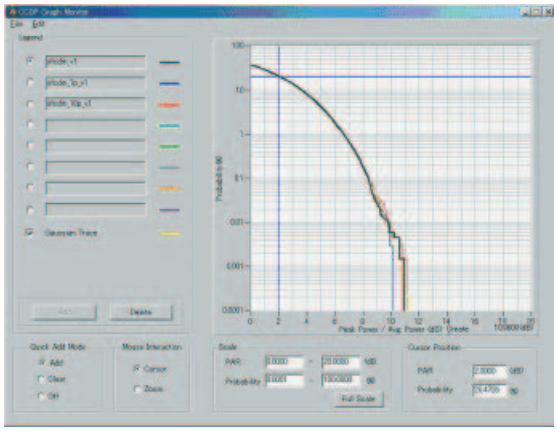
• Simulation function: Simulation



This function displays a generated waveform as a CCDF or FFT graph on the PC. It is useful for checking/reviewing waveforms before transfer to the MG3700A.

• CCDF (Complimentary Cumulative Distribution Function) Graph:

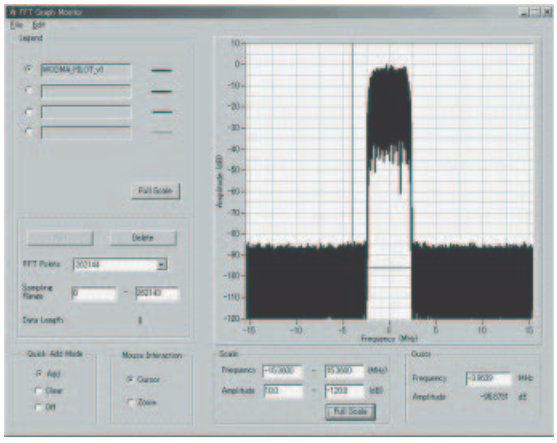
Up to 8 types of generated waveform can be read and displayed as CCDF graphs.



CCDF graph

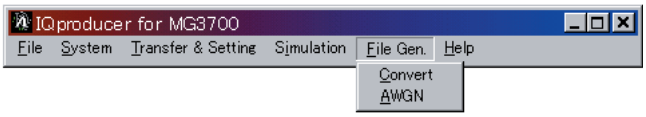
• FFT (Fast Fourier Transform) graph:

Up to 4 types of generated waveform patterns can be read and the transformed results displayed as FFT graphs.



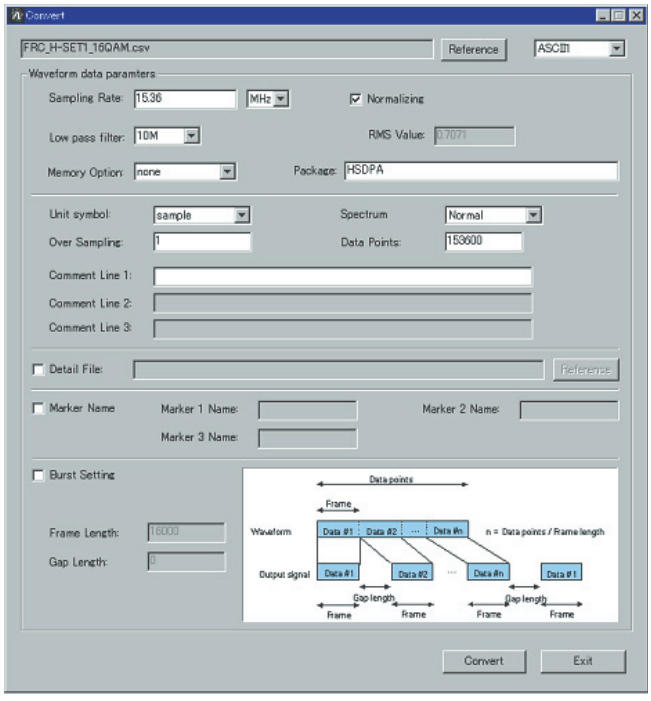
FFT graph

• File generation function: File Gen



• Data convert function: Convert

The IQ sample data files in ASCII format programmed by general signal generation software (such as MATLAB) can also be converted to waveform patterns for MG3700A.
This enhances the convenience of MG3700A for research/development simulation use, since custom-made waveform pattern files can be freely generated.



Convert screen

• AWGN (Additive White Gaussian Noise) waveform generation function

This function establishes the sampling rate and bandwidth, allowing any AWGN waveform pattern to be created.
In addition, when the first combined waveform pattern (Wanted Signal) is selected, the Wanted Signal bandwidth and sampling rate are set automatically.
The resulting AWGN waveform pattern and an existing waveform pattern can be combined, which is useful for base-station dynamic-range measurements.

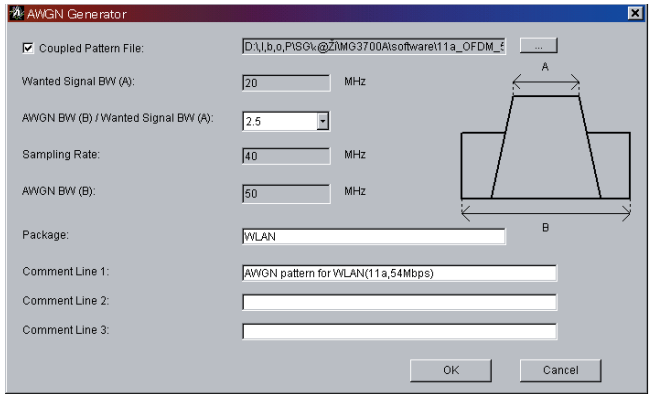
The main set parameter

(1) Wanted Signal BW: Wanted Signal band-width
Setting range: 0.0010 to 120.0000 MHz

(2) AWGN BW (B)/Wanted Signal BW (A):
Magnification of AWGN to Wanted Signal
Setting range: 1.0, 1.5, 2.0, 2.5

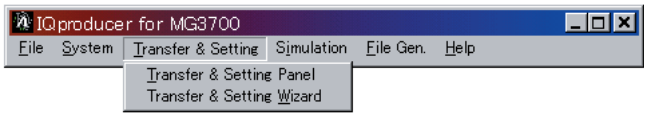
(3) Sampling Rate:
Setting range: 0.0200 to 160.0000 MHz
It makes it to the same value as the Wanted Signal.

(4) AWGN BW (B): Bandwidth of AWGN
It calculates automatically from (1) and (2), and it has the following limitation.
Limit range: 0.001 to 20.000 MHz and “Sampling rate/2” or less than, 20.001 to 120.000 MHz and “Sampling rate” or less than

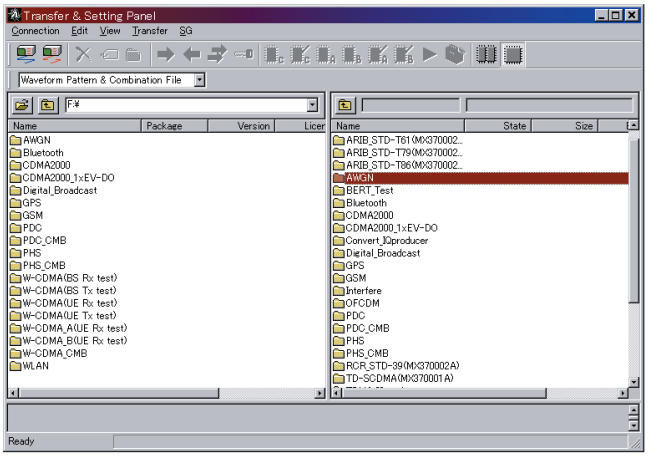


AWGN screen

• Data transfer function: Transfer and Setting


IQproducer for MG3700
File System Transfer & Setting Simulation File Gen. Help
Transfer & Setting Panel
Transfer & Setting Wizard

A PC and the MG3700A can be connected via 100BASE-TX Ethernet, and data such as a waveform pattern generated by IQproducer™, a picture file, or a firmware upgrade file can be transmitted. Since waveform patterns can also be transmitted in a single procedure when multiple MG3700As are connected via a LAN, operating time is reduced.
Moreover, waveform patterns on the MG3700A hard disk can be saved by remote control in the arbitrary waveform memory, and a waveform pattern can also be chosen to output.



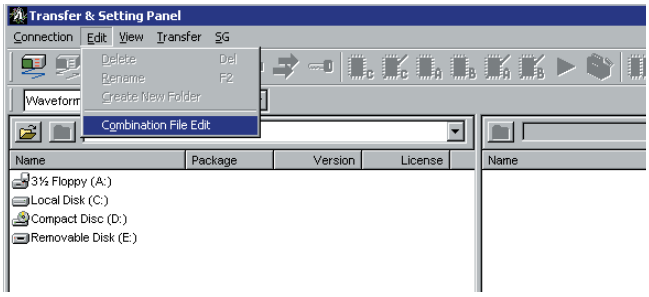
Transfer & Setting screen

• Combination File generation function

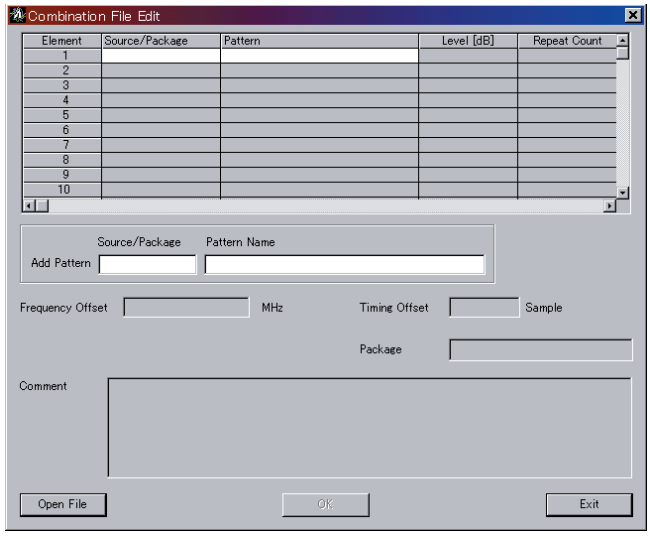
The Combination File Edit function is one of the Transfer & Setting Edit functions. Each Combination File contains the following parameters, so these settings are performed automatically just by selecting the Combination File:

- Waveform pattern
- Repetition times
- Interference waveform pattern (Memory B)
- Frequency offset (at addition of Memory A and Memory B)
- Level ratio (C/N at addition of Memory A and Memory B, and relative level between elements for Memory A only)

Setting the Wanted Signal waveform and interference waveform separately in the two memories makes it easy to measure receiver characteristics.
Moreover, receive signal status transitions can also be verified with a sequence by setting the switching and repetition times for multiple waveform patterns.



Transfer & Setting screen

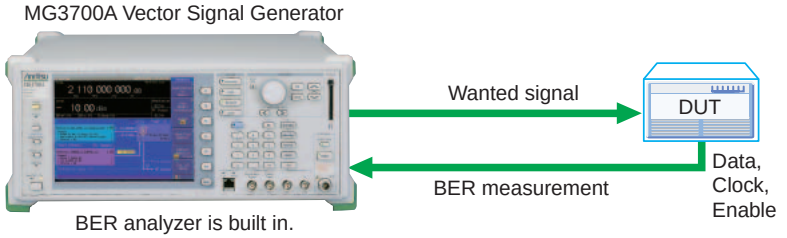


Combination File Edit screen

Measurement sampling

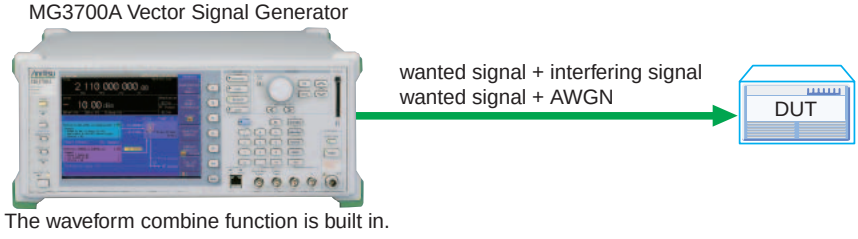
Supports receiving characteristic evaluation for the base station and terminals of various mobile communications:

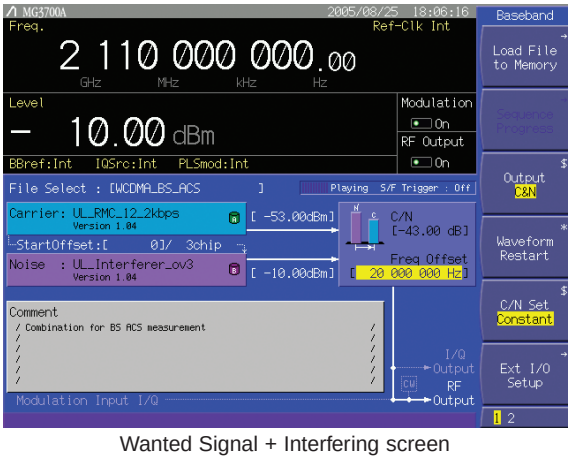
Since MG3700A supports waveform patterns that meet the requirements of mobile communications systems and includes a built-in BER analyzer, it is the optimal equipment for receiving characteristic measurement. Moreover, the MG3700A waveform combining function can combine two waveform patterns. A single MG3700A is thus able to output two signals, such as a “wanted signal + interfering signal” and “wanted signal + AWGN (Additive White Gaussian Noise)”.



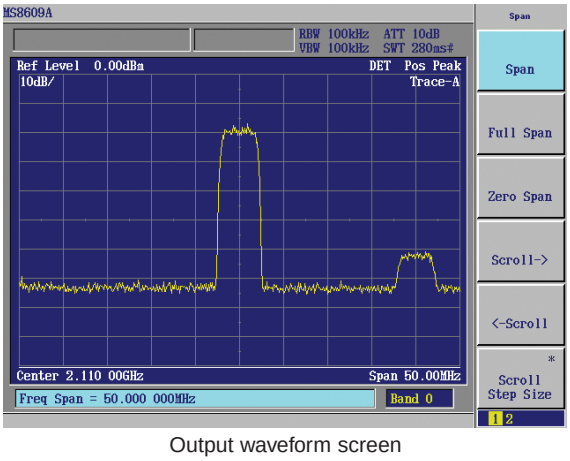
∗Input bit rate: 1 kbps to 20 Mbps (Standard)
100 bps to 120 Mbps (Option)

- The receiving sensitivity test covers the measurement item specified by BER (Bit Error Rate).
  >>> Examples: W-CDMA, GSM, PHS, and PDC
- Since the BER analyzer is built in as a standard feature, a receiver test can be carried out easily with a small footprint.


MG3700A Vector Signal Generator
wanted signal + interfering signal
wanted signal + AWGN
DUT
The waveform combine function is built in.



Wanted Signal + Interfering screen

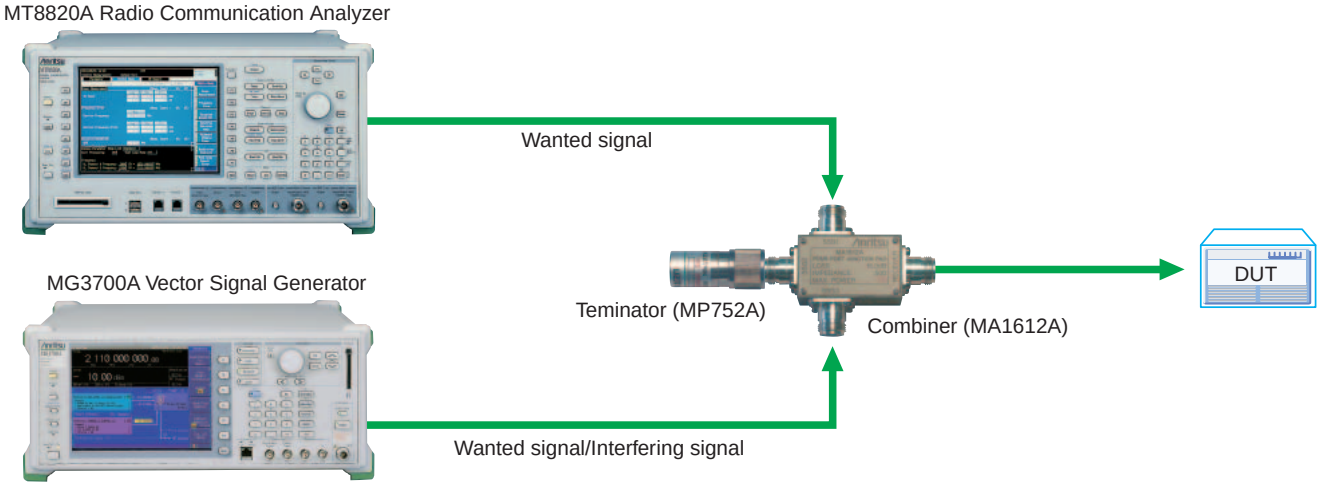


Output waveform screen

- The receiving sensitivity test covers measurements using two signals, such as ACS (Adjacent Channel Selectivity) and the blocking characteristic.
- The waveform combining function enables a single instrument to output a signal such as “wanted signal + interfering signal” and “wanted signal + AWGN”.
- Since S/N adjustment is carried out by digital processing, the level ratio accuracy is excellent.

■ Supports receiving characteristic evaluation of dual system cellular phone-related equipment:

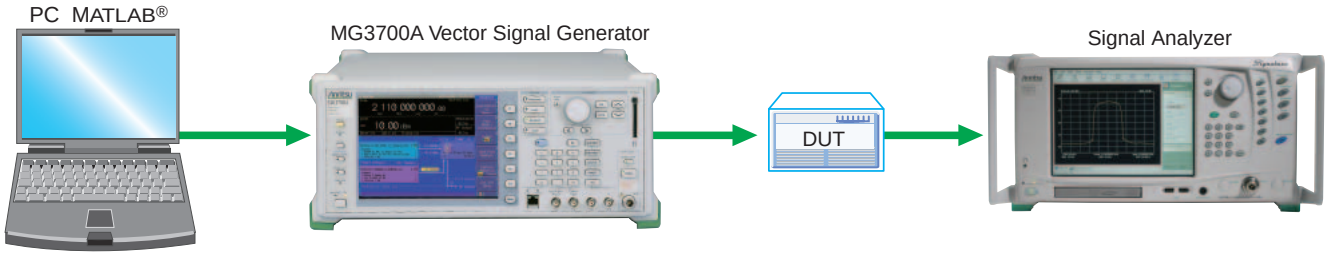
In the cellular phone market where usage of dual systems such as “cellular phone+WLAN” is increasing, a signal source for various communication systems is needed for receiving characteristic evaluation of a terminal/module/tuner. Since MG3700A supports the waveform patterns of major communication systems and it excels in extendibility, it is the optimal signal generator for receiving characteristic evaluation of dual system equipment that will be developed in the near future.
Moreover, it is important to determine that the receiving characteristic is not deteriorated by mutual interference of the new dual communication systems. In this case, the MG3700A can also be used to create an interfering signal.



- A single MG3700A can output the wanted signal for receiving characteristic evaluation of various communication systems.
- It can also be used as an interfering signal for evaluating deterioration of the receiving characteristic due to mutual interference.

■ Supports the research and development of continuously evolving communication systems

By using the IQproducer™ data conversion function, a custom-made waveform file can be freely generated with common EDA tools. For example, an IQ sample data file simulated by MATLAB is convertible to the waveform pattern file used by MG3700A with the “external data conversion function” of IQproducer™. Thus, the MATLAB simulation result can be compared with an actual measurement result.



Specifications

• MG3700A mainframe*1

<table>
<tr><td rowspan="7">Frequency</td><td>Range</td><td>250 kHz to 3 GHz (standard), 250 kHz to 6 GHz (option)</td></tr>
<tr><td>Resolution</td><td>0.01 Hz</td></tr>
<tr><td>Internal reference oscillator</td><td>Frequency: 10 MHz, Aging rate: ±1 x 10^{-8}/day, ±1 x 10^{-7}/year, Temperature stability: ±2 x 10^{-8} (0 to +50°C),
Start-up characteristics (at 23°C):
±5 x 10^{-8} (After 5 min, compared to frequency after 24 h warm-up)
With Rubidium Reference Oscillator Option
Frequency: 10 MHz, Aging rate: ±1 x 10^{-10}/Month, Temperature stability: ±1 x 10^{-9} (0 to +50°C),
Start-up characteristics (at 23°C):
±1 x 10^{-9} (After 7 min, compared to frequency after 24 h warm-up)</td></tr>
<tr><td>External reference input</td><td>Frequency: 5 MHz/10 MHz (auto-switching), Operating range: ±1 ppm, Input level: ≥0.7 Vp-p/50 Ω (AC coupled), Connector: BNC-J (rear panel, Ref Input)</td></tr>
<tr><td>Buffer output</td><td>Frequency: 10 MHz, Output level: TTL (DC coupled), Connector: BNC-J (rear panel, Buffered Output)</td></tr>
<tr><td>Switching time</td><td>Response time from final command to ±0.1* ppm of set frequency on GPIB.
* (When the set frequency is 1 GHz or less, response time from final command to ±100 Hz)
When Frequency changing speed = Normal:
≤40 ms (When going by 3 GHz)
≤15 ms (When the amount of frequency change is less than 1 GHz without going by 3 GHz)
≤20 ms (When the amount of frequency change is 1 GHz or more without going by 3 GHz)
When Frequency changing speed = Fast:
≤40 ms (When going by 3 GHz)
≤10 ms (When not going by 3 GHz)
With Mechanical Attenuator Option
Regardless of frequency changing speed.:
≤100 ms (When going by 3 GHz)
≤80 ms (When not going by 3 GHz)</td></tr>
<tr><td>Frequency setup and Display</td><td>Direct setup: The absolute value of frequency is set up and displayed.
Setup by CH: CH is assigned to frequency. Separate CH tables can be assigned to two or more systems (groups). Group names and CH numbers are set and displayed. Furthermore, the corresponding frequency is displayed simultaneously.</td></tr>
<tr><td rowspan="4">Output level</td><td>Settable range</td><td>–140 to +13 dBm (At CW, accuracy range: –136 to +6 dBm)
With Mechanical Attenuator Option
–140 to +19 dBm (At CW, accuracy range: –136 to +10 dBm)
*: Please refer to “Vector modulation/In the case of vector modulation, the level error in comparison with CW” for level accuracy at vector modulation.</td></tr>
<tr><td>Unit</td><td>Power: dBm,
Voltage: dBµV (terminate voltage display), dBµV (open voltage display)</td></tr>
<tr><td>Resolution</td><td>0.01 dB (dBm, dBµV)</td></tr>
<tr><td>Accuracy</td><td>at CW and 23°C ±5°C:
<table>
<tr><th rowspan="2">Level (p) [dBm]</th><th colspan="3">Frequency (f) [Hz]</th></tr>
<tr><th>250 k ≤f < 25 M</th><th>25 M ≤f ≤3 G</th><th>3 G < f ≤6 G*</th></tr>
<tr><td>+3 < p ≤+6</td><td></td><td>±0.5 dB</td><td></td></tr>
<tr><td>–1 < p ≤+3</td><td></td><td>±0.5 dB</td><td>±0.8 dB</td></tr>
<tr><td>–120 ≤p ≤–1</td><td>±0.5 dB typical</td><td>±0.5 dB</td><td>±0.8 dB</td></tr>
<tr><td>–127 ≤p <–120</td><td></td><td>±0.7 dB</td><td>±2.5 dB typical</td></tr>
<tr><td>–136 ≤p <–127</td><td></td><td>±1.5 dB typical</td><td></td></tr>
</table>
* “Upper frequency 6 GHz option” is required for “3 GHz < f ≤6 GHz.”
With Mechanical Attenuator Option
<table>
<tr><th rowspan="2">Level (p) [dBm]</th><th colspan="3">Frequency (f) [Hz]</th></tr>
<tr><th>250 k ≤f < 25 M</th><th>25 M ≤f ≤3 G</th><th>3 G < f ≤6 G*</th></tr>
<tr><td>+7 < p ≤+10</td><td>±0.5 dB typical</td><td>±0.5 dB</td><td></td></tr>
<tr><td>–100 ≤p ≤+7</td><td>±0.5 dB typical</td><td>±0.5 dB</td><td>±0.8 dB</td></tr>
<tr><td>–120 ≤p <–100</td><td>±0.5 dB typical</td><td>±0.5 dB</td><td>±1.0 dB</td></tr>
<tr><td>–127 ≤p <–120</td><td></td><td>±0.7 dB</td><td>±2.5 dB typical</td></tr>
<tr><td>–136 ≤p <–127</td><td></td><td>±1.5 dB typical</td><td></td></tr>
</table>
* “Upper frequency 6 GHz option” is required for “3 GHz < f ≤6 GHz.”</td></tr>
</table>

Output level	Linearity	at CW, –11 dBm and at 23°C ±5°C: ±0.2 dB typical (at –120 to –11 dBm, 25 MHz ≤f ≤3 GHz) ±0.3 dB typical (at –120 to –11 dBm, 3 GHz < f ≤6 GHz) With Mechanical Attenuator Option at CW, –7 dBm and at 23°C ±5°C: ± 0.2 dB typical (at –120 to –7 dBm, 25 MHz ≤f ≤3 GHz) ± 0.3 dB typical (at –120 to –7 dBm, 3 GHz < f ≤6 GHz)
	Switching time	Response time from final command to ± 0.1 dB of final level on GPIB. f < 25 MHz: ≤15 ms (Normal mode), ≤10 ms (Continuous mode) f ≥25 MHz: ≤10 ms (It is not based on the mode.) With Mechanical Attenuator Option ≤80 ms (Normal mode), ≤10 ms (Continuous mode)
	VSWR	at ≤–11 dBm output level: 1.3 (250 kHz ≤f ≤3 GHz), 1.55 (3 GHz < f ≤6 GHz) With Mechanical Attenuator Option at ≤–7 dBm output level: 1.25 (250 kHz ≤f ≤3 GHz), 1.35 (3 GHz < f ≤6 GHz)
	Special setting mode	Continuous mode and EXT ALC mode are the exclusive modes.
	Continuous mode	Level adjustment is possible at 0.01 dB steps in the range of "+3/–10 dB", without becoming Output off on the basis of the conditions when shifting to continuous mode.
	EXT ALC mode	Output level is changed according to the direct-current voltage inputted externally. Variable range: –8/+3 dB, Input impedance: 600 Ω (nominal), Connector: BNC-J (rear panel, Ext. ALC)
	Output connector	50 Ω, N-J (front panel, RF Output)
	Maximum reverse input	Reverse input power: 1 Wpeak (≥300 MHz), 0.25 Wpeak (<300 MHz), DC: 0 V When Mechanical Attenuator Option Reverse input power: 1 Wpeak, DC: 0 V
Signal purity	Spurious	at CW, ≤–1 dBm (With Mechanical Attenuator Option: ≤+3 dBm)
	Harmonics	<–30 dBc (f ≥ 300 MHz@E-ATT, f ≥250 kHz@M-ATT)
	Non harmonic	<–60 dBc (Expect the intersection spurious* of 2.4 GHz, 25 MHz to 3 GHz) <–54 dBc (Expect the intersection spurious* of 4.4 GHz, 3 to 6 GHz) *Intersection spurious: 4.8 GHz – [output frequency] (at 25 MHz to 3 GHz), 8.8 GHz – [output frequency] (at 3 to 6 GHz)
	Power supply relation	<–50 dBc (250 kHz to 3 GHz), <–44 dBc (3 GHz to 6 GHz)
Vector modulation	EVM	at 23°C ± 5°C and Output level ≤–1 dBm (With Mechanical Attenuator Option: ≤+3 dBm) ≤2% rms., ≤1% rms typical (at W-CDMA Down link 1code modulation, Output frequency: 800 to 1,000 MHz, 1,800 to 2,400 MHz) at 23°C ± 5°C and Output level ≤–4 dBm (With Mechanical Attenuator Option: ≤0 dBm) ≤1% rms. (at OFDM modulation equal to IEEE802.11a/g, Output frequency: 2,400 to 2,497 MHz, 4,900 to 5,925 MHz) ≤5% peak (at modulation equal to IEEE802.11b, Output frequency: 2,400 to 2,497 MHz)
	ACLR (5 MHz offset)	at 23°C ± 5°C when using signal of W-CDMA (Test Model1 64DPCH): –61 dBc/3.84 MHz, –63 dBc/3.84 MHz typical (≤–4 dBm, 800 to 1,000 MHz, 1,800 to 2,400 MHz) With Mechanical Attenuator Option –62 dBc/3.84 MHz, –64 dBc/3.84 MHz typical (≤0 dBm, 800 to 1,000 MHz, 1,800 to 2,400 MHz)
	ACLR (10 MHz offset)	at 23°C ± 5°C when using signal of W-CDMA (Test Model1 64DPCH): –66 dBc/3.84 MHz typical (≤–1 dBm, 800 to 1,000 MHz, 1,800 to 2,400 MHz) With Mechanical Attenuator Option –67 dBc/3.84 MHz typical (≤+3 dBm, 800 to 1,000 MHz, 1,800 to 2,400 MHz)
	In the case of vector modulation, the level error in comparison with CW.*2	±0.2 dB [when outputting W-CDMA Downlink 1code, 1 carrier] at the guaranteed range (Level) of level accuracy in the following modulation conditions. 50 MHz ≤f ≤3 GHz: Level ≤+2 dBm 3 GHz < f ≤6 GHz: Level ≤–1 dBm With Mechanical Attenuator Option 50 MHz ≤f ≤3 GHz: Level ≤+7 dBm 3 GHz < f ≤6 GHz: Level ≤+4 dBm
	Carrier leak	≤–40 dBc (at 23°C ± 5°C)
	Image rejection	≤–40 dBc (at 23°C ± 5°C. When complex sine wave 10 MHz or less is used.)
	External modulation	Input level: $\sqrt{(I^2 + Q^2)}$ = 0.5 V (rms.), Maximum input level: –5 V (peak) ≤I, Q ≤+5 V (peak), Input impedance: 50 Ω, Input connector: BNC-J (Front panel, Modulation Input IQ)
	RF spectrum invert	I, Q signal changeable when internal modulation. Spectrum Normal: The usual spectrum output Spectrum Reverse: The inverted spectrum output

Pulse modulation	Internal modulation	ON/OFF ratio: >60 dB, Rise/fall time: <90 ns (10 to 90%), Pulse repetition frequency: DC to 1 MHz, (Duty 50%)
	External modulation	Input range: 0 to 5 V, Input level threshold: about 1 V, ON/OFF ratio: >60 dB, Rise/Fall time: <90 ns (10 to 90%), Pulse repetition frequency: DC to 1 MHz, (Duty 50%), Input connector: 50 Ω BNC-J (rear panel, Ext Pulse Mod Input)
IQ output	Output voltage range	When output open. Output voltage amplitude + DC offset: –3.5 to +3.5 V
	Output voltage amplitude	When output open. Amplitude change: I, $\overline{\text{I}}$ simultaneous change, Q, $\overline{\text{Q}}$ simultaneous change, I, ($\overline{\text{I}}$) and Q, ($\overline{\text{Q}}$) are independent change. Amplitude variable range: 0 to 120% (100% = 640 mV rms., RMS=1634) Variable step: 0.1% Accuracy: ± 0.5 dB (1 kHz sine wave, Amplitude variable range ≥10%)
	DC offset variable range	In-phase DC offset: Variable range: –1 to +3 V, Resolution: 10 mV Differential DC offset: Variable range: –50 to +50 mV, Resolution: 50 µV
	Output connector	50 Ω, D-Sub 15-J (rear panel, IQ Output, differential), Pin assignment (10 = I, 11 = $\overline{\text{I}}$, 13 = Q, 14 = $\overline{\text{Q}}$, other =GND)
Arbitrary function generation	Waveform resolution	14 bit
	LPF	There are eight kinds as LPF cutoff of a baseband part. Automatic selection and manual selection are possible. 100 kHz, 300 kHz, 1 MHz, 3 MHz, 10 MHz, 30 MHz, 70 MHz, through
Marker output	Function	When a signal is assigned to a marker signal bit at the time of waveform generation, a maximum of three signals, such as a pulse modulation signal (for internal modulation), and a frame timing signal, can be outputted.
	Number of ports	3 ports
	Connector	TTL, BNC-J (rear panel, AUX Input/Output Connector1/2/3)
Base-band reference clock signal	Internal clock signal	Range: 20 kHz to 160 MHz, Resolution: 0.001 Hz
	External clock input signal	Input frequency range: 20 kHz to 40 MHz, Divide and multiply functions: The signal of “1, 2, 4, 8, 16, 1/2, 1/4, 1/8, 1/16” times of input frequency is generated internally, and it can be used as a sampling clock of DAC. Connector: BNC-J (rear panel, Baseband Reference Clock) Input level: ≥0.7 V (p-p)/50 Ω (AC coupled)
Waveform memory	Memory capacity	There are two Waveform memories. A and B. 128 Msamples/channel x 2, MAX 256 Msamples/channel With ARB Memory Upgrade 512 Msample option 256 Msamples/channel x 2, MAX 512 Msamples/channel
	The number of files which can be opened	The number of waveform patterns that can be opened per waveform memory (A/B) is a maximum of 4,096. 100 packages per waveform memory, 100 patterns in one package. The minimum number of samples per pattern: 1000

Waveform memory	Memory mode	Defined Mode Selection of a single waveform pattern to be used in either waveform memory A or B, selection of waveform patterns by a combination file that defines addition of multiple waveform patterns, and the addition level ratio can be set at once in this mode. If a combination file that specifies two or more waveform patterns in waveform memory A is selected, the following sequence operations become enabled. • Selection of pattern switching mode (Auto/Manual) • Selection of pattern switching point (Frame end/Pattern end) • Switching of pattern by an external trigger signal (enabled when the pattern switching mode is Manual) • Restart of sequence • Maximum number of elements: 200 • Minimum number of points per pattern: 1000 Level ratio setting range: Two-signal level ratio <80 dB or OFF Level setting resolution: 0.01 dB Frequency offset variable width: ± (0.8 x Sampling Clock x 2^n – Bandwidth)/2 (n: The maximum integer that satisfies "Sampling Clock x 2^n ≤80 MHz." It is 0 when the sampling clock is greater than 20 MHz.) Frequency setting resolution: 1 Hz In this mode, two waveform memories can be connected for use as a 256 Msamples long (when ARB Memory Upgrade 512 Msample option is installed, 512 Msamples long) memory. Edit Mode One waveform each is selected from waveform memory A and waveform memory B, these two waveforms are added up and then output. Two signal levels, the waveform memory B start offset and frequency offset, can be set. Level ratio setting range: Two-signal level ratio <80 dB or OFF Level setting resolution: 0.01 dB Frequency offset variable width: ± (0.8 x Sampling Clock x 2^n – Bandwidth)/2 (n: The maximum integer that satisfies "Sampling Clock x 2^n ≤80 MHz." It is 0 when the sampling clock is greater than 20 MHz.) Frequency setting resolution: 1 Hz
Start/Frame trigger	Function	Switchable between continuous output and burst output.
	Input connector	Functional change: A connector is shared by Start trigger and Frame trigger; it is switched depending on the situation. Connector: BNC-J (Front panel, Start/Frame Trigger), Input level: TTL, Logic: Polarity a Rise/Fall can be selected.
	Start trigger	It is used in order to start waveform output.
	Frame trigger	It is used in order to look for the timing of a burst in the case of burst output. The data of burst length is outputted at the timing of a frame trigger. And it waits for the following frame trigger.
Pattern trigger	Function	When a waveform pattern for the sequence mode is used, the pattern can be switched upon an external trigger.
	Input connector	Connector: Front panel, Pattern Trigger, BNC-J connector Input level: TTL Logic: The rising or falling polarity can be selected.
BER measurement function	Function	BER measurement can be performed for the data sequence converted into 1 and 0 after demodulation.
	Input connector	TTL, BNC-J (rear panel, BER Input)
	Input signal	Data, Clock, Enable (Polarity reversal is possible.)
	Input level	TTL
	Input threshold level	Conforming to threshold (0.8 to 2.4 V) of TTL
	Input bit rate	1 kbps to 20 Mbps
	Measurable Patterns	PN 9, 11, 15, 20, 23, ALL0, ALL1, repetition of 0 and 1
	Measurable BER	0% to 1% (Reference value. Changed by the condition of the communication system and the data rate.)
	Measurable time	≤359999.0 sec
	Mode	Single, Endless, Continuous.
	Display	BitError, SyncLoss, ClockError, EnableError, Error Rate, Error Count
	Measurable bit count	1000 to 4294967295 (2^{32} – 1) bit
	Auto Resync function	Can be switched between enable/disable

BER measurement function (Option: MG3700A-031, MG3700A-131)	Function	BER can be measured for data strings converted to 1s and 0s following demodulation.
	Connector	Rear panel, BER Input, BNC-J connector
	Input signal	Data, Clock, Enable (Polarity reversal is possible)
	Input level	0 to 5 V
	Input threshold level	0.20 to 3.00 V (0.05 V step)
	Input impedance	50 Ω, High impedance
	Adjustable range of input timing	–1 to 15 clock (Data/Enable is adjusted for input Clock.)
	Input bit rate	100 bps to 120 Mbps
	Measurable patterns	PN 9, 11, 15, 20, 23, ALL0, ALL1, ALT(01 repetition) PN 9fix, 11fix, 15fix, 20fix, 23fix, UserDefine
	Measurable BER	0 to 10% (Reference value. Changed by the condition of the communication system and the data rate.)
	Measurable bit count	1000 to 4294967295 ($2^{32} – 1$) bit
	Measurable error bit	1 to 2147483647 ($2^{31} – 1$) bit
	Auto Resync	On, Off (When On is set, it becomes SyncLoss by the error detecting condition of Threshold and the measurement is stopped. When Off is set, the detection of SyncLoss is not performed.) Threshold setting range: [numerator/denominator] Choose from denominator = 500, 5000, 50000, numerator = 1 to denominator/2, (Default: 200/500)
	Measurement mode	Single, Continuous, Endless
	Display	BitError, SyncLoss, ClockError, Enable Error, SyncLoss Count, Overflow Data Count, Overflow SyncLoss, Error Rate, Error Count
External interface	GPIB	Target of control: The functions except a power supply switch, local key, and contrast keys are controllable etc. Interface: SH1, AH1, T6, L4, TE0, SR1, RL1, PP0, DC1, DT1, C0, E2 Connector: GPIB (rear panel, GPIB)
	100BASE-TX Ether	Function: Waveform pattern transfer and control. Connector: Modular jack [Cat.5] 8pin (front panel and rear panel, Ethernet) In order to use the Ethernet connector of a front panel, it is necessary to short-circuit two Ethernet connectors of a rear panel by a U link cable (standard accessory).
	Memory card	Function: Waveform pattern, a memory parameter, software, and CH table can be saved or recalled to/from a Compact-Flash card. Connector: Slot (front panel, CF Card)
Display	Size	8.4 inch, 640 x 480 dots, color TFT LCD
	On/Off setting	Panel display On/Off
	Screen save	A currently displayed screen can be saved to HDD/CF card as a BMP file.
Power	Voltage	AC 100 to 120 V, 200 to 240 V (–15/+10%, 250 V MAX)
	Frequency	47.5 to 63 Hz
	Power consumption	≤200 VA
	Temperature Operating	+5 to +45°C
	Storage	–20 to +60°C
Dimensions and mass		426 (W) x 177 (H) x 451 (D) mm, ≤15 kg (excluding option)
EMC		EN61326: 1997/A2: 2001 (Class A), EN61000-3-2: 2000 (Class A), EN61326: 1997/A2: 2001 (Annex A)
LVD		EN61010-1: 2001 (Pollution Degree 2)

∗1 The following conditions are applied unless otherwise specified.
Common to CW mode and modulation mode. [Continuous mode: Off, External ALC: Off, Frequency switching speed: Normal, Pulse modulation: Off], Only during modulation mode [Input level to DAC (RMS): Full scale 14 dB to full scale 17 dB, Sampling rate: >100 kHz, Memory mode: Except combining two waveform, IQ Output: Off, After CAL execution, During internal modulation]

∗2 At modulation mode, ALC: Off

Composition guide

The MG3700A Vector Signal Generator includes a variety of general hardware and software as standard equipment. Therefore, optional equipment is not required. When the model name “MG3700A” is specified, it is supplied with the functions and performance marked as “standard” in the following table.
However, you may choose and combine the functions and performance marked as “option” in the following table in order to add hardware performance extensions and waveform pattern software.

Classification	Outline	Standard	Option	Note
Frequency range	250 kHz to 3 GHz	✓		
	250 kHz to 6 GHz		✓	6 GHz Frequency Extension Option
Reference oscillator	Standard	✓		Frequency: 10 MHz, Aging rate: ±1 x 10^{-8}/day, ±1 x 10^{-7}/year
	Rubidium Reference Oscillator		✓	Rubidium Reference Oscillator Option Frequency: 10 MHz, Aging rate: ±1 x 10^{-10}/Month
Attenuator	Electron Attenuator	✓		
	Mechanical Attenuator		✓	Mechanical Attenuator Option The electron attenuator mounted as standard is changed into mechanical attenuator.
Memory	1 GBytes = 256 Msamples/channel	✓		128 Msamples/channel x 2. It can be used as a maximum of 256 Msamples/channel.
	2 GBytes = 512 Msamples/channel		✓	ARB Memory Upgrade 512 Msample Option 256 Msamples/channel x 2. It can be used as a maximum of 512 Msamples/channel.
Base-band generator	Internal/External	✓		Vector modulation band-width (Internal): 120 MHz Vector modulation band-width (External): 150 MHz
BER analyzer		✓		Input bit rate: 1 kbps to 20 Mbps Measurable Patterns: PN 9/11/15/20/23, ALL0, ALL1, repetition of 0 and 1
			✓	High speed BER Test function Option Input bit rate: 100 bps to 120 Mbps Measurable Patterns: PN 9/11/15/20/23, ALL0, ALL1, repetition of 0 and 1 PN9fix/11fix/15fix/20fix/23fix, UserDefine
Hard disk	40 GBytes	✓		A non-volatile hard disk for saving various waveform patterns and parameters of MG3700A.
Waveform patterns software*1	W-CDMA	✓		These waveform patterns are stored in the hard disk as standard. License is not required in order to use these.
	GSM/EDGE	✓		
	CDMA2000 1X/1xEV-DO	✓		
	W-LAN (IEEE802.11a/b/g)	✓		
	PDC	✓		
	PHS	✓		
	Bluetooth®	✓		
	GPS	✓		
	Digital Broadcast (ISDB-T 1 segment, BS, CS, CATV)	✓		
	AWGN	✓		
	TD-SCDMA		✓	The license is required. (Model: MX370001A)
	Public Radio System (ARIB STD-T61/T79/T86)		✓	The license is required. (Model: MX370002A)
IQproducer™ License for each system*1	HSDPA/HSUPA		✓	The license is required. (Model: MX370101A)
	Universal TDMA		✓	The license is required. (Model: MX370102A)
	CDMA2000 1xEV-DO		✓	The license is required. (Model: MX370103A)
	Multi-carrier		✓	The license is required. (Model: MX370104A)
	Mobile WiMAX		✓	The license is required. (Model: MX370105A)
	DVB-T/H		✓	The license is required. (Model: MX370106A)
IQproducer™ (PC application software)	Parameter setting function	✓		In accordance with the standards of various communication systems, the various parameters of a waveform pattern can be edited easily. The parameter edit results are saved as a setting file, and can also be recalled.
	Data converter function	✓		The setting file created by the system with the “parameter setting function” is converted to an MG3700A waveform pattern. When using the MG3700A generated waveform signal, the above “license for each system” is needed. Moreover, a setting file programmed by the C language or MATLAB can be converted to a waveform pattern. In this case, a license is not required.
	Data transfer function	✓		Waveform patterns, display copy files, and update programs can be transmitted from a PC to MG3700A via Ethernet.
	Simulator function	✓		Allows a waveform to be checked on a PC by FFT and CCDF before sending the waveform pattern to a mainframe.
Warranty service	1 year	✓		
	2 years		✓	Standard 1 year + 1 year
	3 years		✓	Standard 1 year + 2 years
	5 years		✓	Standard 1 year + 4 years

*1: Please see the waveform pattern and IQproducer data sheet.

Ordering Information

Please specify model/order number, name, and quantity when ordering.

Model/Order No.	Name	Remarks
	— Mainframe —	
MG3700A	Vector Signal Generator	
	— Standard accessories —	
J0017F	Power Cord, 2.6 m: 1 pc	
J1276	LAN Straight Cable: 1 pc	10 cm, For U link connection on Rear panel
	Compact Flash: 1 pc	64 MB or more
J1254	Compact Flash Adapter: 1 pc	
Z0742	MG3700A CD-ROM: 1 pc	Main frame operation manual, IQproducer operation manual, Standard waveform operation manual, IQproducer software
	— Options —	
MG3700A-001	Rubidium Reference Oscillator	Aging rate: ±1 x 10^{-10}/Month
MG3700A-002	Mechanical Attenuator	Standard Electron Attenuator is changed into Mechanical Attenuator.
MG3700A-011	Upper Frequency 6 GHz	Standard “250 kHz to 3 GHz” is extended to “250 kHz to 6 GHz.”
MG3700A-021	ARB Memory Upgrade 512 M Sample	Standard “128 Msample/channel x 2” is extended to “256 Msample/channel x 2.”
MG3700A-031	High Speed BER Test Function	Standard “BER Test function” is extended.
MG3700A-101	Rubidium Reference Oscillator Retrofit	Retrofitted to the already-shipped mainframe.
MG3700A-102	Mechanical Attenuator Retrofit	Retrofitted to the already-shipped mainframe.
MG3700A-103	Electronic Attenuator Retrofit	Retrofitted to the already-shipped mainframe.
MG3700A-111	Upper Frequency 6 GHz Retrofit	Retrofitted to the already-shipped mainframe.
MG3700A-121	ARB Memory Upgrade 512 M Sample Retrofit	Retrofitted to the already-shipped mainframe.
MG3700A-131	High Speed BER Test Function Retrofit	Retrofitted to the already-shipped mainframe.
	— Maintenance service —	
MG3700A-ES210	Extended Warranty Service	Two years
MG3700A-ES310	Extended Warranty Service	Three years
MG3700A-ES510	Extended Warranty Service	Five years
	— Softwares (Waveform pattern) —	
MX370001A	TD-SCDMA Waveform Pattern	
MX370002A	Public Radio System Waveform Pattern	RCR STD-39, ARIB STD-T61/T79/T86
	— Softwares (License Key for IQproducer system) —	
MX370101A	HSDPA/HSUPA IQproducer	
MX370102A	TDMA IQproducer	
MX370103A	CDMA2000 1xEV-DO IQproducer	
MX370104A	Multi-carrier IQproducer	
MX370105A	Mobile WiMAX IQproducer	
MX370106A	DVB-T/H IQproducer	
	— Optional accessories —	
Z0777	Standard Waveform Pattern Upgrade Kit	(DVD 4 piece sets)
W2495AE	MG3700A Operation Manual	
W2496AE	MG3700A IQproducer Operation Manual	
W2539AE	MG3700A Standard Waveform Pattern Operation Manual	
W2533AE	MX370001A TD-SCDMA Waveform Pattern Operation Manual	
W2503AE	MX370101A HSDPA/HSUPA IQproducer Operation Manual	
W2504AE	MX370102A TDMA IQproducer Operation Manual	
W2505AE	MX370103A CDMA2000 1xEV-DO IQproducer Operation Manual	
W2633AE	MX370104A Multi-carrier IQproducer Operation Manual	
W2734AE	MX370105A Mobile WiMAX IQproducer Operation Manual	
W2798AE	MX370106A DVB-T/H IQproducer Operation Manual	
G0141	HDD ASSY	For Embedded HDD Exchange
K240B	Power Divider (K connector)	DC to 26.5 GHz, K-J, 50 Ω, 1 Wmax
MA1612A	Four-Port Junction Pad	5 MHz to 3 GHz, N-J
MP752A	Termination	DC to 12.4 GHz, 50 Ω, N-P
MA2512A	Band Pass Filter	For W-CDMA, pass band: 1.92 to 2.17 GHz
J0576B	Coaxial Cord, 1.0 M	N-P・5D-2W・N-P
J0576D	Coaxial Cord, 2.0 M	N-P・5D-2W・N-P
J0127A	Coaxial Cord, 1.0 M	BNC-P・RG-58A/U・BNC-P
J0127B	Coaxial Cord, 2.0 M	BNC-P・RG-58A/U・BNC-P
J0127C	Coaxial Cord, 0.5 M	BNC-P・RG-58A/U・BNC-P
J0322A	Coaxial Cord, 0.5 M	SMA-P・SMA-P, DC to 18 GHz, 50 Ω
J0322B	Coaxial Cord, 1.0 M	SMA-P・SMA-P, DC to 18 GHz, 50 Ω
J0322C	Coaxial Cord, 1.5 M	SMA-P・SMA-P, DC to 18 GHz, 50 Ω
J0322D	Coaxial Cord, 2.0 M	SMA-P・SMA-P, DC to 18 GHz, 50 Ω

Model/Order No.	Name	Remarks
J1264	N-SMA Adapter	N-P・SMA-J
J1261B	Ethernet Cable (Shield Type)	Straight, 3 m
J1261D	Ethernet Cable (Shield Type)	Cross, 3 m
J0008	GPIB CABLE, 2.0 M	
J1277	IQ Output Conversion Adapter	D-SUB/BNC
B0329C	Front Cover for 1MW 4U	
B0331C	Front Panel Handle Kit	2 pcs/set
B0332	Joint Plate	4 pcs/set
B0333C	Rack Mount Kit	
B0334C	Hardtype Carrying Case	With front cover and a casters
P0021	Compact Flash 128 MB	
P0022	Compact Flash 256 MB	
P0023	Compact Flash 512 MB	

Typical (typ):
Performance is not warranted. A large majority of all products meet typical performance.
Nominal:
Values are not warranted. They are included to facilitate the application of the product.
Example:
Performance is not warranted. Data are actually measured by randomly selected measuring instruments.

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